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EXAMINER	
AHN, SAM K	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

8f

Office Action Summary	Application No.	Applicant(s)	
	10/772,013	SANTHOFF ET AL.	
	Examiner	Art Unit	
	Sam K. Ahn	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 03 February 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-24 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-8 and 10-24 is/are rejected.

7)☒ Claim(s) 9 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 03 February 2004 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 020304.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Drawings

2. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 2,3,14,15,17,23 and 24 are objected to because of the following informalities:

   In claim 2, line 3, "that can range" should be "that range".

   In claim 3, line 4, "that can range" should be "that range".

   In claim 14, line 1, "the at least" should be "the at least one", line 2, "that can range" should be "that range".

In claim 15, line 1, "the at least" should be "the at least one", line 2, "that can range" should be "that range".

In claim 17, line 4, "bits; and" should be "bits;".

In claim 23, line 2, "that can range" should be "that range".

In claim 24, line 2, "that can range" should be "that range".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-3,5,6,10,11 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. US 2002/0075972 A1 (Richards '972) in view of Fullerton US 6,549,567 B1 (Fullerton '567).

   Regarding claim 1, Richards '972 teaches an ultra-wideband communication system (see Figs. 6 and 7 of a transmitter and of a receiver of an impulse radio communications utilizing ultra wide band technology, note paragraph 0006, 0159 and 0166) comprising: an ultra-wideband transmitter (transmitter in Fig.6) structured to transmit a training set of ultra-wideband pulses (training sequence of impulse or training sequence of ultra wide band pulses, note paragraph 0008 and 0275, is transmitted in a plurality of frames with an impulse, wherein the impulse is

transmitted using the ultra wide band technology, note paragraph 0006); and an ultra-wideband receiver (see Fig.16 and note paragraph 0277, the receiver receiving the plurality of impulses) structured to receive the training set of ultra-wideband pulses (note paragraph 0277, wherein the received impulses comprises the training sequence transmitted, note paragraph 0276).

And although Richards '972 teaches the transmitter and the receiver transmitting and receiving through a wireless medium via antennas (624 in Fig.6 for transmitting and 704 in Fig.7 for receiving) and suggests that wire or cable can be implemented for a communications interface between a computer and an external device (note paragraph 0309), Richards '972 does not explicitly teach wherein the wire medium is implemented between the transmitter and the receiver.

Fullerton '567 teaches, in the same field of endeavor, ultra-wideband transmitter (904 in Fig.9) and ultra-wideband receiver (912 in Fig.9) transmitting and receiving, respectively, an ultra-wideband signal (504 in Fig.5, note col.8, lines 17-18, ultrawide-band impulse radio signal) through a wire medium (note col.10, lines 12-15 medium cable). Hence, both Richards '972 and Fullerton '567 teach ultra wide-band transmitter and receiver transmitting and receiving the ultra wide-band signal, and further, Fullerton '567 suggests that ultra wide-band signal can be implemented in a wire medium between the transmitter and the receiver, as previously explained. One skilled in the art would further recognize through implementation of wire medium, the receiver would suffer less of noise or interference of fading types, which is well-known in the art to be experienced in a wireless environment. On the other hand,

one skilled in the art would further recognize that a wireless environment allows the transmitter and receiver to be mobile. Therefore, it would have been obvious to one skilled in the art at the time of the invention to recognize that the transmitter and the receiver of Richards '972 (see Figs. 6 and 7 of a transmitter and of a receiver of an impulse radio communications utilizing ultra wide band technology, note paragraph 0006, 0159 and 0166) communicate through a cable medium as suggested by Fullerton '567 (note col.10, lines 12-15 medium cable).

Regarding claim 2, Richards '972 further teaches wherein each of the ultra-wideband pulses comprising the training set (training sequence of impulse or training sequence of ultra wide band pulses, note paragraph 0008 and 0275, is transmitted in a plurality of frames with an impulse, wherein the impulse is transmitted using the ultra wide band technology, note paragraph 0006) comprise a pulse of electromagnetic energy (see waveform 102 in Fig.1A of the impulse signal or pulse) having a duration that can range from about 10 picoseconds to about 10 milliseconds (note paragraph 0117 wherein each pulse of the plurality of impulses transmitted have a length of 0.5 nanosecond, which is within the range from about 10 picoseconds to about 10 milliseconds).

Regarding claim 3, Richards '972 further teaches wherein each of the ultra-wideband pulses comprising the training set (training sequence of impulse or training

sequence of ultra wide band pulses, note paragraph 0008 and 0275, is transmitted in a plurality of frames with an impulse, wherein the impulse is transmitted using the ultra wide band technology, note paragraph 0006) comprise a pulse of electromagnetic energy (see waveform 102 in Fig.1A of the impulse signal or pulse) having a duration that can range from about 10 picoseconds to about 10 milliseconds (note paragraph 0117 wherein each pulse of the plurality of impulses transmitted have a length of 0.5 nanosecond, which is within the range from about 10 picoseconds to about 10 milliseconds) and a power that can range from about +30 power decibels to about -60 power decibels, as measured at a single radio frequency (see Fig.1B wherein power measurement at the vicinity of 0 MHz is nearly –32 dB, which is within the range from about +30 power decibels to about -60 power decibels).

Regarding claim 5, Richards '972 further teaches wherein the ultra-wideband transmitter (transmitter in Fig.6) comprises an ultra-wideband pulse modulator (note paragraph 0161 wherein the transmitter comprises timing generator 608, code source 612 along with internally generated subcarrier signal to generate modulated signal 618) that is structured to transmit a multiplicity of ultra-wideband pulses (training sequence of impulse or training sequence of ultra wide band pulses, note paragraph 0008 and 0275, is transmitted in a plurality of frames with an impulse, wherein the impulse is transmitted using the ultra wide band technology, note paragraph 0006).

Regarding claim 6, Richards '972 further teaches wherein the ultra-wideband receiver (see Fig.7) comprises an ultra-wideband pulse demodulator (710,713,732 correlating the received signal and demodulating) that is structured to receive a multiplicity of ultra-wideband pulses (receiving the training sequence of impulse or training sequence of ultra wide band pulses, note paragraph 0008 and 0275, is transmitted in a plurality of frames with an impulse, wherein the impulse is transmitted using the ultra wide band technology, note paragraph 0006).

Regarding claim 10, Richards '972 teaches a method of optimizing an ultra-wideband communication (see Figs. 6 and 7 of a transmitter and of a receiver of an impulse radio communications utilizing ultra wide band technology, note paragraph 0006, 0159 and 0166) comprising: an ultra-wideband transmitter (transmitter in Fig.6) transmitting a training set of ultra-wideband pulses (training sequence of impulse or training sequence of ultra wide band pulses, note paragraph 0008 and 0275, is transmitted in a plurality of frames with an impulse, wherein the impulse is transmitted using the ultra wide band technology, note paragraph 0006); and an ultra-wideband receiver (see Fig.16 and note paragraph 0277, the receiver receiving the plurality of impulses) receiving the training set of ultra-wideband pulses (note paragraph 0277, wherein the received impulses comprises the training sequence transmitted, note paragraph 0276). Richards '972 further teaches determining which

of the ultra-wideband pulses in the training set (training sequence in the first, second, third or fourth position received by correlators, 1608,1609,1626 and 1621 in Fig.16 and note paragraph 0277) was received in a form that is most similar to a transmitted form (template 1672 in Fig.16 providing template signal in a transmitted form, which is an ideal waveform of an expected received waveform by the receiver, note paragraph 0168, hence determining when and what impulses will be received by each of the correlators through the training sequence, note paragraph 0278).

And although Richards '972 teaches the transmitter and the receiver transmitting and receiving through a wireless medium via antennas (624 in Fig.6 for transmitting and 704 in Fig.7 for receiving) and suggests that wire or cable can be implemented for a communications interface between a computer and an external device (note paragraph 0309), Richards '972 does not explicitly teach wherein the wire medium is implemented between the transmitter and the receiver.

Fullerton '567 teaches, in the same field of endeavor, ultra-wideband transmitter (904 in Fig.9) and ultra-wideband receiver (912 in Fig.9) transmitting and receiving, respectively, an ultra-wideband signal (504 in Fig.5, note col.8, lines 17-18, ultrawide-band impulse radio signal) through a wire medium (note col.10, lines 12-15 medium cable). Hence, both Richards '972 and Fullerton '567 teach ultra wide-band transmitter and receiver transmitting and receiving the ultra wide-band signal, and further, Fullerton '567 suggests that ultra wide-band signal can be implemented in a wire medium between the transmitter and the receiver, as previously explained. One skilled in the art would further recognize through implementation of wire medium, the

receiver would suffer less of noise or interference of fading types, which is well-known in the art to be experienced in a wireless environment. On the other hand, one skilled in the art would further recognize that a wireless environment allows the transmitter and receiver to be mobile. Therefore, it would have been obvious to one skilled in the art at the time of the invention to recognize that the transmitter and the receiver of Richards '972 (see Figs. 6 and 7 of a transmitter and of a receiver of an impulse radio communications utilizing ultra wide band technology, note paragraph 0006, 0159 and 0166) communicate through a cable medium as suggested by Fullerton '567 (note col.10, lines 12-15 medium cable).

Regarding claim 11, Richards '972 further teaches the step of determining which of the ultra-wideband pulses in the training set was received in the form that is most similar to the transmitted form, as explained above, is selected from a group of steps selected from: correlating (by the correlators 1608,1609,1626 and 1621 in Fig.16 and note paragraph 0277) each of the received ultra-wideband pulses (the pulses in the training sequence) with a corresponding pulse template (template 1672 in Fig.16 providing template signal in a transmitted form, which is an ideal waveform of an expected received waveform by the receiver, note paragraph 0168, hence determining when and what impulses will be received by each of the correlators through the training sequence, note paragraph 0278), and determining which of the transmitted ultra-wideband pulses most closely matches its corresponding pulse template (determining which of the first, second, third or fourth position of the

training sequence, note paragraph 0276, matches in the correlator with the template 1672, note paragraph 0277); calculating a received signal strength indicator for each of the transmitted ultra-wideband pulses, and selecting the pulse having a highest received signal strength indicator; and determining a radio frequency content for each of the transmitted ultra-wideband pulses, and selecting the pulse having a received radio frequency content that is most similar to a transmitted radio frequency content.

Regarding claim 14, the claim is rejected as applied to claim 2 with similar scope.

Regarding claim 15, the claim is rejected as applied to claim 3 with similar scope.

Regarding claim 16, the claim is rejected as applied to claim 4 with similar scope.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. US 2002/0075972 A1 (Richards '972) in view of Fullerton US 6,549,567 B1 (Fullerton '567) and Pendergrass et al. US 2002/0191690 A1 (Pendergrass).

Regarding claim 4, Richards '972 in view of Fullerton '567 teach the training set (training sequence of impulse or training sequence of ultra wide band pulses, note paragraph 0008 and 0275, is transmitted in a plurality of frames with an impulse, wherein the impulse is transmitted using the ultra wide band technology, note paragraph 0006), however, do not explicitly teach at least one ultra-wideband pulse

selected from a group consisting of: a pre-distorted pulse, a pre-emphasized pulse, a shaped pulse, a substantially triangular pulse, a substantially square pulse, a pulse occupying a portion of a radio frequency spectrum, with a segment of the occupied radio frequency spectrum substantially eliminated; and a pulse occupying a portion of a radio frequency spectrum, with a segment of the occupied radio frequency spectrum amplified.

Pendergrass teaches, in the same field of endeavor, generation of ultra-wideband pulse (822 in Fig.8 Pulse Generator in an impulse transmission ultra wideband transmitter, note paragraph 0106) at least one ultra-wideband pulse selected from a group consisting of: a pre-distorted pulse, a pre-emphasized pulse, a shaped pulse, a substantially triangular pulse, a substantially square pulse, a pulse occupying a portion of a radio frequency spectrum, with a segment of the occupied radio frequency spectrum substantially eliminated; and a pulse occupying a portion of a radio frequency spectrum, with a segment of the occupied radio frequency spectrum amplified (generating a square wave pulse type, as well as other pulse types, note paragraph 0106). Hence, Richards '972, Fullerton '567 and Pendergrass teach generation of ultra-wideband pulse, and Pendergrass further suggests that the ultra-wideband pulse is of square wave pulse type. It is well-known to one skilled in the art that square wave pulse type is less complicated to generate, also note paragraph 0412 of Richards et al. US 2002/0061081 A1. Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the teaching of Pendergrass in the system of Richards '972 by implementing the square wave pulse

type in the pulse generator of Richards '972 (622 in Fig.6) for the purpose of generating the training set of ultra-wideband pulses (training sequence of impulse or training sequence of ultra wide band pulses, note paragraph 0008 and 0275, is transmitted in a plurality of frames with an impulse, wherein the impulse is transmitted using the ultra wide band technology, note paragraph 0006) with less complicated logic, as previously explained.

6. Claims 7,8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. US 2002/0075972 A1 (Richards '972) in view of Fullerton US 6,549,567 B1 (Fullerton '567) and Fullerton US 5,677,927 (Fullerton '927).

Regarding claim 7, Richards '972 in view of Fullerton '567 teach all subject matter claimed, as applied to claim 1. And although Fullerton '567 teaches the wire medium (note col.10, lines 12-15 medium cable), do not explicitly teach wherein the wire medium is selected from a group consisting of: an optical fiber ribbon, a fiber optic cable, a single mode fiber optic cable, a multi-mode fiber optic cable, a twisted pair wire, an unshielded twisted pair wire, a plenum wire, a PVC wire, a coaxial cable, and an electrically conductive material.

Fullerton '927 teaches wherein the wire medium is a coaxial cable (note col.13, lines 3-21 wherein the coaxial cable is implemented to transmit ultra wideband signals). Fullerton further suggests that through this implementation, antennas in the transmitter and the receiver is eliminated. One skilled in the art at the time of the

invention would further recognize through implementation of coaxial cable as the wire medium, the receiver would suffer less of noise or interference of fading types, which is well-known in the art to be experienced in a wireless environment and would not be necessary to implement antennas in the system. On the other hand, one skilled in the art would further recognize that a wireless environment allows the transmitter and receiver to be mobile. Therefore, it would have been obvious to one skilled in the art at the time of the invention to recognize that the transmitter and the receiver of Richards '972 (see Figs. 6 and 7 of a transmitter and of a receiver of an impulse radio communications utilizing ultra wide band technology, note paragraph 0006, 0159 and 0166) communicate through a coaxial cable as the cable medium as for the purpose of eliminating the antennas in the system, as taught by Fullerton '927 (note col.13, lines 3-21 wherein the coaxial cable is implemented to transmit ultra wideband signals).

Regarding claim 8, Richards '972 in view of Fullerton '567 teach all subject matter claimed, as applied to claim 1. And although Fullerton '567 teaches the wire medium (note col.10, lines 12-15 medium cable), do not explicitly teach wherein the wire medium is selected from a group consisting of: a power line, an optical network, a cable television network, a community antenna television network, a community access television network, a hybrid fiber coax system network, a public switched telephone network, a wide area network, a local area network, a metropolitan area

network, a TCP/IP network, a dial-up network, a switched network, a dedicated network, a nonswitched network, a public network and a private network.

Fullerton '927 teaches wherein the wire medium is implemented in a local area network (note col.12, line 67 – col.13, line 21 wherein the medium cable is implemented to transmit ultra wideband signals in the local area network). One skilled in the art at the time of the invention would further recognize through implementation of the medium cable in the local area network, the receiver would suffer less of noise or interference of fading types, which is well-known in the art to be experienced in a wireless environment and would not be necessary to implement antennas in the system. On the other hand, one skilled in the art would further recognize that a wireless environment allows the transmitter and receiver to be mobile. Therefore, it would have been obvious to one skilled in the art at the time of the invention to recognize that the transmitter and the receiver of Richards '972 (see Figs. 6 and 7 of a transmitter and of a receiver of an impulse radio communications utilizing ultra wide band technology, note paragraph 0006, 0159 and 0166) communicate through the medium cable in the local area network using local area network cables as suggested by Fullerton '927 (note col.12, line 67 – col.13, line 21 wherein the medium cable is implemented to transmit ultra wideband signals in the local area network).

Regarding claim 13, the claim is rejected as applied to claim 7 with similar scope.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. US 2002/0075972 A1 (Richards '972) in view of Fullerton US 6,549,567 B1 (Fullerton '567) and Pan US 6,968,130 B1.

Regarding claim 12, Richards '972 in view of Fullerton '567 teach all subject matter claimed, as applied to claim 10. And although Fullerton '567 teaches the wire medium (note col.10, lines 12-15 medium cable), do not explicitly teach wherein the wire medium is selected from a group consisting of: a power line, an optical network, a cable television network, a community antenna television network, a community access television network, and a hybrid fiber coax system.

Pan teaches transmission of ultra wideband signals in a wired medium of an optical network (note col.12, lines 7-10). Hence, Fullerton '567 and Pan teach implementation of ultra wideband signals in a wired medium, wherein Pan further teaches that the wired medium is an optical network. Pan teaches amount of bandwidth is of great demand (note col.1, lines 16-25) and fully utilizing the optical communication band maximizes the bandwidth (note col.2, lines 32-35, col.12, lines 6-8). Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the teaching of Pan in the system of Richards '972 in view of Fullerton '567 by implementing the optical network in the wired medium for the purpose of understanding amount of bandwidth is of great demand (note col.1, lines 16-25) and fully utilizing the optical communication band to maximize the bandwidth (note col.2, lines 32-35, col.12, lines 6-8).

8. Claims 17-19,23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. US 6,571,089 B1 (Richards '089) in view of Fullerton US 6,549,567 B1 (Fullerton '567).

Regarding claim 17, Richards '089 teaches a method comprising the steps of: transmitting a data set of ultra-wideband pulses (transmitter 3574 in Fig.35 transmitting 128 pulses per data bit, note col.31, lines 47-58) the data set of ultra-wideband pulses comprising a group of bits (a group of data bits supplied by information source 620 or 3570 in Fig.35 of digital bits representing voice, data, etc. note col.11, lines 52-56); and receiving the data set of ultra-wideband pulses (receiving the transmitted pulses via 3514 in Fig.35); and determining a data set bit-error-rate (bit error rate or BER evaluation 3564 in Fig.35, note col.39, lines 35-39).

However, Richards '089 does not explicitly teach wherein the medium between the transmitter and the receiver is a wire medium.

Fullerton '567 teaches, in the same field of endeavor, ultra-wideband transmitter (904 in Fig.9) and ultra-wideband receiver (912 in Fig.9) transmitting and receiving, respectively, an ultra-wideband signal (504 in Fig.5, note col.8, lines 17-18, ultrawide-band impulse radio signal) through a wire medium (note col.10, lines 12-15 medium cable). Hence, both Richards '089 and Fullerton '567 teach ultra wide-band transmitter and receiver transmitting and receiving the ultra wide-band signal, and further, Fullerton '567 suggests that ultra wide-band signal can be implemented in a wire medium between the transmitter and the receiver, as previously explained. One skilled in the art would further recognize through implementation of wire medium, the

receiver would suffer less of noise or interference of fading types, which is well-known in the art to be experienced in a wireless environment. On the other hand, one skilled in the art would further recognize that a wireless environment allows the transmitter and receiver to be mobile. Therefore, it would have been obvious to one skilled in the art at the time of the invention to recognize that the transmitter and the receiver of Richards '089 communicate through a cable medium as suggested by Fullerton '567 (note col.10, lines 12-15 medium cable).

The recitation in the preamble is not given patentable weight since the recitation recites the intended use of a structure and the body of claim does not depend on the preamble for completeness and the bodily limitations are able to stand alone.

Regarding claim 18, Richards '089 further teaches the step of adjusting an ultra-wideband pulse recurrence frequency relative to the data set bit-error-rate (bit error rate measurement 3562 is used for power control 3558, note col.39, lines 25-39, by adjusting the periods of pulses from 8 periods of 16 pulses to 7 periods of 16 pulses, thus results in adjustment of pulse recurrence frequency, pulse transmission rate or pulse repetition rate from 128 pulses per bit to 112 pulses per bit, note col.31, lines 47-58).

Regarding claim 19, Richards '089 further teaches wherein the data set bit-error-rate comprises a percentage of bits that have an error relative to a total number of

received bits (BER is a ratio of error bits to the total number of bits transmitted, note col.16, lines 24-26).

Regarding claim 23, Richards '089 further teaches wherein each of the ultra-wideband pulses comprises a pulse of electromagnetic energy having a duration that can range from about 10 picoseconds to about 10 milliseconds (see 102 in Fig.1A, wherein each pulse of the plurality of impulses transmitted have a length of 0.5 nanosecond, which is within the range from about 10 picoseconds to about 10 milliseconds).

Regarding claim 24, Richards '089 further teaches wherein each of the ultra-wideband pulses comprise a pulse of electromagnetic energy (see waveform 102 in Fig.1A of the impulse signal or pulse) having a duration that can range from about 10 picoseconds to about 10 milliseconds (wherein each pulse of the plurality of impulses transmitted have a length of 0.5 nanosecond, which is within the range from about 10 picoseconds to about 10 milliseconds) and a power that can range from about +30 power decibels to about -60 power decibels, as measured at a single radio frequency (see Fig.1B wherein power measurement at the vicinity of 0 MHz is nearly –32 dB, which is within the range from about +30 power decibels to about -60 power decibels).

9. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. US 6,571,089 B1 (Richards '089) in view of Fullerton US 6,549,567 B1 (Fullerton '567) and Fullerton US 5,677,927 (Fullerton '927).

Regarding claim 20, Richards '089 in view of Fullerton '567 teach all subject matter claimed, as applied to claim 17. And although Fullerton '567 teaches the wire medium (note col.10, lines 12-15 medium cable), do not explicitly teach wherein the wire medium is selected from a group consisting of: an optical fiber ribbon, a fiber optic cable, a single mode fiber optic cable, a multi-mode fiber optic cable, a twisted pair wire, an unshielded twisted pair wire, a plenum wire, a PVC wire, a coaxial cable, and an electrically conductive material.

Fullerton '927 teaches wherein the wire medium is a coaxial cable (note col.13, lines 3-21 wherein the coaxial cable is implemented to transmit ultra wideband signals). Fullerton further suggests that through this implementation, antennas in the transmitter and the receiver is eliminated. One skilled in the art at the time of the invention would further recognize through implementation of coaxial cable as the wire medium, the receiver would suffer less of noise or interference of fading types, which is well-known in the art to be experienced in a wireless environment and would not be necessary to implement antennas in the system. On the other hand, one skilled in the art would further recognize that a wireless environment allows the transmitter and receiver to be mobile. Therefore, it would have been obvious to one skilled in the art at the time of the invention to recognize that the transmitter and the receiver of Richards '089 communicate through a coaxial cable as the cable medium

as for the purpose of eliminating the antennas in the system, as taught by Fullerton '927 (note col.13, lines 3-21 wherein the coaxial cable is implemented to transmit ultra wideband signals).

Regarding claim 21, Richards '089 in view of Fullerton '567 teach all subject matter claimed, as applied to claim 1. And although Fullerton '567 teaches the wire medium (note col.10, lines 12-15 medium cable), do not explicitly teach wherein the wire medium is selected from a group consisting of: a power line, an optical network, a cable television network, a community antenna television network, a community access television network, a hybrid fiber coax system network, a public switched telephone network, a wide area network, a local area network, a metropolitan area network, a TCP/IP network, a dial-up network, a switched network, a dedicated network, a nonswitched network, a public network and a private network.

Fullerton '927 teaches wherein the wire medium is implemented in a local area network (note col.12, line 67 – col.13, line 21 wherein the medium cable is implemented to transmit ultra wideband signals in the local area network). One skilled in the art at the time of the invention would further recognize through implementation of the medium cable in the local area network, the receiver would suffer less of noise or interference of fading types, which is well-known in the art to be experienced in a wireless environment and would not be necessary to implement antennas in the system. On the other hand, one skilled in the art would further recognize that a wireless environment allows the transmitter and receiver to be

mobile. Therefore, it would have been obvious to one skilled in the art at the time of the invention to recognize that the transmitter and the receiver of Richards '089 communicate through the medium cable in the local area network using local area network cables as suggested by Fullerton '927 (note col.12, line 67 – col.13, line 21 wherein the medium cable is implemented to transmit ultra wideband signals in the local area network).

10. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Richards et al. US 6,571,089 B1 (Richards '089) in view of Fullerton US 6,549,567 B1 (Fullerton '567) and Richards et al. US 2002/0075972 A1 (Richards '972).

Regarding claim 22, Richards '089 further teaches correlating (710 in Fig.11 by the correlator and note paragraph 0277) each of the received ultra-wideband pulses (the pulses in the training sequence) with a corresponding pulse template (template 1672 in Fig.16 providing template signal in a transmitted form.

However, do not explicitly teach determining which of the transmitted ultra-wideband pulses most closely matches its corresponding pulse template.

Richards '972 teaches the step of determining which of the ultra-wideband pulses in the training set was received in the form that is most similar to the transmitted form, as explained above, is selected from a group of steps selected from: correlating (by the correlators 1608,1609,1626 and 1621 in Fig.16 and note paragraph 0277) each of the received ultra-wideband pulses (the pulses in the training sequence) with a

corresponding pulse template (template 1672 in Fig.16 providing template signal in a transmitted form, which is an ideal waveform of an expected received waveform by the receiver, note paragraph 0168, hence determining when and what impulses will be received by each of the correlators through the training sequence, note paragraph 0278), and determining which of the transmitted ultra-wideband pulses most closely matches its corresponding pulse template (determining which of the first, second, third or fourth position of the training sequence, note paragraph 0276, matches in the correlator with the template 1672, note paragraph 0277); calculating a received signal strength indicator for each of the transmitted ultra-wideband pulses, and selecting the pulse having a highest received signal strength indicator; and determining a radio frequency content for each of the transmitted ultra-wideband pulses, and selecting the pulse having a received radio frequency content that is most similar to a transmitted radio frequency content.

Hence, both Richards '089 and Richards '972 teach transmission and reception of ultra wideband signals wherein correlation takes place at a receiver by correlating the received ultra-wideband pulses with a corresponding pulse template, as previously explained. And further, Richards '972 teach the correlation of training sequence in order to assist in making demodulation decisions (note paragraph 0278). Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the teaching of Richards '972 in the receiver of Richards '089 (3510 in Fig.35) of receiving the training sequence for the purpose of training

the receiver, thus assisting in making demodulation decisions (note paragraph 0278).

Allowable Subject Matter

11. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: present application discloses an ultra wideband system comprising a transmitter and a receiver coupled to each other via a wired medium. Prior art teaches all the subject matter claimed. However, prior art does not explicitly teach after receiving a training sequence, responding to the transmitter of which of the training sequence most closely matches to the template.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Ahn whose telephone number is (571) 272-3044. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Sam K. Ahn
Patent Examiner

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